

Notice of Allowability

Application No.

09/666,281

Examiner

Tony Mahmoudi

Applicant(s)

LEE ET AL.

Art Unit

2175

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendments filed on 29-April-2004 and 27-August-2004.
2. ☒ The allowed claim(s) is/are 1-3 and 7-23, re-numbered as claims 1-20.
3. ☒ The drawings filed on 21 September 2000 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 28-August-2004.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

C. Rones
CHARLES RONES
PRIMARY EXAMINER

DETAILED ACTION

Remarks

1. In response to communications filed on 29-April-2004, new claims 21-23 have been added per applicant's request.
2. In view of the amendment faxed on 27-August-2004, authorized to be entered as an "examiner's amendment", claims 4-5 are canceled, and claims 1, 11, 14, and 19 are amended per applicant's request. Therefore, claims 1-3 and 7-23 are presently pending in the application, of which, claims 1, 7, 11, 14, and 19 are in independent format.

Examiner's Amendment

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Samuel Ntiros (Attorney of Record) on 27-August-2004, and via the "amendment authorized to be entered by examiner", faxed on 27-August-2004 (see enclosed Interview Summary, dated 27-August-2004, for details.)

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Claims 1, 4-5, 11, 14, and 19 have been amended by the examiner as follows. A new listing of the claims is provided in this Office Action (in paragraph 6), following the Reasons for Allowance:

Claim 1 (Currently Amended):

A multimedia data structure embodied in a computer readable medium and used for an image search, comprising:

- (a) information describing at least one feature of a certain image;
- (b) recent user feedback information based on user relevance feedback; [and]
- (c) whole feedback information based on the user relevance feedback obtained since formation of the data structure;

recent user feedback reliability information representing how reliable the recent user feedback information is; and

whole feedback reliability information representing how reliable the whole feedback information is, wherein the recent user feedback reliability information is expressed by

$$1 - \frac{\left[\sum_{i=0}^{i=m} (N - n_i) \right]}{N}$$

where, N is a number of user feedback responses, m is a number of images in a similar image list, and n_i is a number of user feedback responses given to the i-th image.

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Claim 4 (Currently Amended):

Canceled.

Claim 5 (Currently Amended):

Canceled.

Claim 11 (Currently Amended):

A [The] multimedia data structure [as claimed in claim 1] embodied in a computer readable medium and used for an image search, comprising:

information describing at least one feature of a certain image;

recent user feedback information based on user relevance feedback;

whole feedback information based on the user relevance feedback obtained since formation of the data structure, wherein the recent user feedback information is represented as a similar image list, and the similar image list has an image list structure which includes a similar image identification, a score reflecting the current feedback, and a waiting duration representing a time period between a final feedback time point and a present time point.

Claim 14 (Currently Amended):

A method of determining weights of image features used for an image search based on user relevance feedback, comprising:

(a) providing a multimedia data structure including information describing the features of a certain image, recent user feedback information for the image, and whole feedback information for the image based on user relevance feedback obtained since formation of the data structure, and reliability information corresponding to the recent user feedback information and whole feedback information;

(b) updating the recent user feedback information and whole feedback information and their reliabilities by learning them in response to the user relevance feedback;

(c) determining weights of the image features in proportion to the reliabilities of the recent feedback information, the whole feedback information, or both the recent feedback information and the whole feedback information; wherein the reliability of the recent user feedback information is expressed by

$$1 - \frac{\left[\sum_{i=0}^{i=m} (N - n_i) \right]}{N}$$

where, N is a number of user feedback responses, m is a number of images in a similar image list, and n_i is a number of user feedback responses given to the i-th image.

Claim 19 (Currently Amended):

A multimedia data structure embodied in a computer readable medium and reflecting change of a user relevance feedback for determining weights of image features used for an image search, comprising:

- (a) information describing at least one feature of a certain image;
- (b) recent user feedback information based on user relevance feedback;
- (c) whole feedback information based on the user relevance feedback obtained since formation of the data structure; and
- (d) reliability information indicating reliability of at least one of the user feedback information and whole feedback information, wherein the recent user feedback information is represented as a similar image list, and the similar image list has an image list structure which includes a similar image identification, a score reflecting the current feedback, and a waiting duration representing a time period between a final feedback time point and a present time point.

Allowance

4. Claims 1-3 and 7-23 are allowed over the prior art made of record.
5. The following is an examiner's statement of reasons for allowance:

The applicant's amendment, authorized by the attorney to be entered as an "examiner's amendment", filed on 27-August-2004, overcomes the cited prior art with respect to the

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independent claims. Independent claims 1, 7, 11, 14, and 19 have been amended to incorporate "allowable subject matter", indicated in the previous office action.

The prior art of record, Ma et al (U.S. Patent No. 6,347,313), Liddy et al (U.S. Patent No. 6,304,864), Herz (U.S. Patent No. 6,460,036), and Cohen (U.S. Patent No. 6,067,539) do not disclose, teach, or suggest the claimed limitations of (in combination with all other features in the claims):

wherein the recent user feedback reliability information is expressed by

$$1 - \frac{\sum_{i=0}^{i=m} (N - n_i)}{N}$$

where, N is a number of user feedback responses, m is a number of images in a similar image list, and n_i is a number of user feedback responses given to the i-th image, as claimed in claims 1 and 14.

Claims 2-3 and 21-23 are allowed over prior art made of record because they are dependents from the allowed independent claim 1.

Claims 15-18 are allowed over the prior art made of record because they are dependents from the allowed independent claims 14.

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The prior art of record, Ma et al (U.S. Patent No. 6,347,313), Liddy et al (U.S. Patent No. 6,304,864), Herz (U.S. Patent No. 6,460,036), and Cohen (U.S. Patent No. 6,067,539) do not disclose, teach, or suggest the claimed limitations of (in combination with all other features in the claims):

(b) if it is checked that the similar image does not exist in the current queue, inputting the similar image to an uppermost space of a queue entrance, setting a number of feedback responses of the similar image to "1", and shifting images existing in the queue to lower positions by one space;

(c) if it is checked that the similar image exists in the current queue, increasing the number of feedback responses of the similar image, and shifting other images in the queue to upper positions by "N"; and

(d) if any image is shifted to a lower position over a size of the queue at the respective steps, deleting the image shifted to the lower position from the queue, as claimed in claim 7.

Claims 8-10 are allowed over the prior art made of record because they are dependents from the allowed independent claim 7.

The prior art of record, Ma et al (U.S. Patent No. 6,347,313), Liddy et al (U.S. Patent No. 6,304,864), Herz (U.S. Patent No. 6,460,036), and Cohen (U.S. Patent No. 6,067,539) do not disclose, teach, or suggest the claimed limitations of (in combination with all other features in the claims):

wherein the recent user feedback information is represented as a similar image list, and the similar image list has an image list structure which includes a similar image identification, a score reflecting the current feedback, and a waiting duration representing a time period between a final feedback time point and a present time point, as claimed in claims 11 and 19.

Claims 12-13 are allowed over the prior art made of record because they are dependents from the allowed independent claim 11.

Claim 20 is allowed over the prior art made of record because it is dependent from the allowed independent claim 19.

Listing of the Claims

6. The following is a listing of the claims, as amended by the examiner. This listing of claims will replace all prior versions, and listings of claims in the Application:

1. **(Currently Amended)** A multimedia data structure embodied in a computer readable medium and used for an image search, comprising:

- (a) information describing at least one feature of a certain image;
- (b) recent user feedback information based on user relevance feedback; [and]

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(c) whole feedback information based on the user relevance feedback obtained since formation of the data structure;

recent user feedback reliability information representing how reliable the recent user feedback information is; and

whole feedback reliability information representing how reliable the whole feedback information is, wherein the recent user feedback reliability information is expressed by

$$1 - \frac{\left[\sum_{i=0}^{i=m} (N - n_i) \right]}{N}$$

where, N is a number of user feedback responses, m is a number of images in a similar image list, and n_i is a number of user feedback responses given to the i-th image.

2. (Previously presented) The multimedia data structure as claimed in claim 1, wherein the recent user feedback information is determined for a predetermined time period or by a predetermined frequency.

3. (Previously presented) The multimedia data structure as claimed in claim 1, wherein the recent user feedback information includes a weight value learned by the user relevance feedback or similar image information, and the whole feedback information is represented by

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a weight value learned by the user relevance feedback given since formation of the data structure.

4. **(Currently Amended)** Canceled.

5. **(Currently Amended)** Canceled.

6. **(Previously Canceled.)**

7. **(Previously Presented)** A method of managing image information for an image search, comprising:

forming a data structure which includes information describing features of a certain image, recent user feedback information, and whole feedback information; and

determining weights for the features of the certain image based on the recent user feedback information and the whole feedback information,

wherein the method further comprises:

representing the recent user feedback information by a similar image list, and

reflecting a recent user feedback pattern based by the similar image list using a queue algorithm, and

wherein the queue algorithm comprises:

(a) checking whether a similar image exists in a current queue when the similar image is fed back;

(b) if it is checked that the similar image does not exist in the current queue, inputting the similar image to an uppermost space of a queue entrance, setting a number of feedback responses of the similar image to "1", and shifting images existing in the queue to lower positions by one space;

(c) if it is checked that the similar image exists in the current queue, increasing the number of feedback responses of the similar image, and shifting other images in the queue to upper positions by "N"; and

(d) if any image is shifted to a lower position over a size of the queue at the respective steps, deleting the image shifted to the lower position from the queue.

8. (Previously presented) The method as claimed in claim 7, wherein "N" is fixed or variably determined in accordance with the similar image.

9. (Previously presented) The method as claimed in claim 7, wherein "N" is varied in inverse proportion to a frequency of appearance of the similar image.

10. (Previously presented) The method as claimed in claim 7, wherein if the similar image does not exist in the queue when the similar image is fed back, the similar image is inputted to the queue only in case that the similar image is fed back more than a specified threshold number.

11. **(Currently Amended)** A [The] multimedia data structure [as claimed in claim 1] embodied in a computer readable medium and used for an image search, comprising:
information describing at least one feature of a certain image;
recent user feedback information based on user relevance feedback;
whole feedback information based on the user relevance feedback obtained since
formation of the data structure, wherein the recent user feedback information is represented as a similar image list, and the similar image list has an image list structure which includes a similar image identification, a score reflecting the current feedback, and a waiting duration representing a time period between a final feedback time point and a present time point.

12. (Previously presented) A similar image list managing method for the multimedia data structure recited in claim 11, comprising:

managing a similar image list in a manner that only images whose scores are over a predetermined threshold number are maintained in the list, or only images whose scores are on N upper positions of the list if a size of the list is N.

13. (Previously presented) A feedback reflecting score updating method for the multimedia structure recited in claim 11, comprising updating image scores in a manner that

(a) with respect to image fed back from similar images, a following calculation is performed: $\text{Score (new)} = \text{Score (current)} \times \text{fW (Waiting Duration)} + 1$; and

(b) with respect to other images not fed back, a following calculation is performed: $\text{Score (new)} = \text{Score (current)} \times \text{fW (Waiting Duration)}$; and wherein fW (Waiting Duration) is a

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function having a characteristic that it returns smaller values as the waiting duration becomes longer.

14. **(Currently Amended)** A method of determining weights of image features used for an image search based on user relevance feedback, comprising:

(a) providing a multimedia data structure including information describing the features of a certain image, recent user feedback information for the image, and whole feedback information for the image based on user relevance feedback obtained since formation of the data structure, and reliability information corresponding to the recent user feedback information and whole feedback information;

(b) updating the recent user feedback information and whole feedback information and their reliabilities by learning them in response to the user relevance feedback;

(c) determining weights of the image features in proportion to the reliabilities of the recent feedback information, the whole feedback information, or both the recent feedback information and the whole feedback information; wherein the reliability of the recent user feedback information is expressed by

$$1 - \frac{\left[\sum_{i=0}^{i=m} (N - n_i) \right]}{N}$$

where, N is a number of user feedback responses, m is a number of images in a similar image list, and n_i is a number of user feedback responses given to the i-th image.

15. (Previously presented) The method as claimed in claim 14, wherein the recent user feedback information is represented by a weight value learned by the user relevance feedback or a similar image information, and the whole feedback information is represented by a weight value learned by feedback given since formation of the data structure.

16. (Previously presented) The method as claimed in claim 14, wherein the reliability of the recent user feedback information is determined in proportion to a consistency of a recently used pattern or feedback.

17. (Previously presented) The method as claimed in claim 14, wherein the reliability of the whole feedback information is determined in proportion to a number of feedback responses concerned in learning.

18. (Previously presented) The method as claimed in claim 14, wherein the reliability of the whole feedback information is responsive to recorded user usage records wherein the recorded user usage records provide feedback to the reliability of the whole feedback information without user interaction.

19. **(Currently Amended)** A multimedia data structure embodied in a computer readable medium and reflecting change of a user relevance feedback for determining weights of image features used for an image search, comprising:

(a) information describing at least one feature of a certain image;

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- (b) recent user feedback information based on user relevance feedback;
- (c) whole feedback information based on the user relevance feedback obtained since formation of the data structure; and
- (d) reliability information indicating reliability of at least one of the user feedback information and whole feedback information, wherein the recent user feedback information is represented as a similar image list, and the similar image list has an image list structure which includes a similar image identification, a score reflecting the current feedback, and a waiting duration representing a time period between a final feedback time point and a present time point.

20. (Previously presented) The multimedia data structure of claim 19, wherein the reliability information indicates reliability of both of the user feedback information and the whole feedback information.

21. (Previously presented) The multimedia data structure as claimed in claim 1, wherein the recent user feedback information and whole feedback information provide an indication of relevance of the information describing the at least one feature of the certain image.

22. (Previously presented) The multimedia data structure of claim 1, wherein the at least one feature includes at least one of a color histogram, a texture histogram, and a dominant color of the image.

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23. (Previously presented) The multimedia data structure of claim 1, wherein the information provides a statistical description of the image.

Conclusion

7. Any inquiries concerning this communication or earlier communications from the examiner should be directed to Tony Mahmoudi whose telephone number is (703) 305-4887. The examiner can normally be reached on Mondays-Fridays from 08:00 am to 04:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici, can be reached at (703) 305-3830.

tm

August 30, 2004


CHARLES RONES
PRIMARY EXAMINER